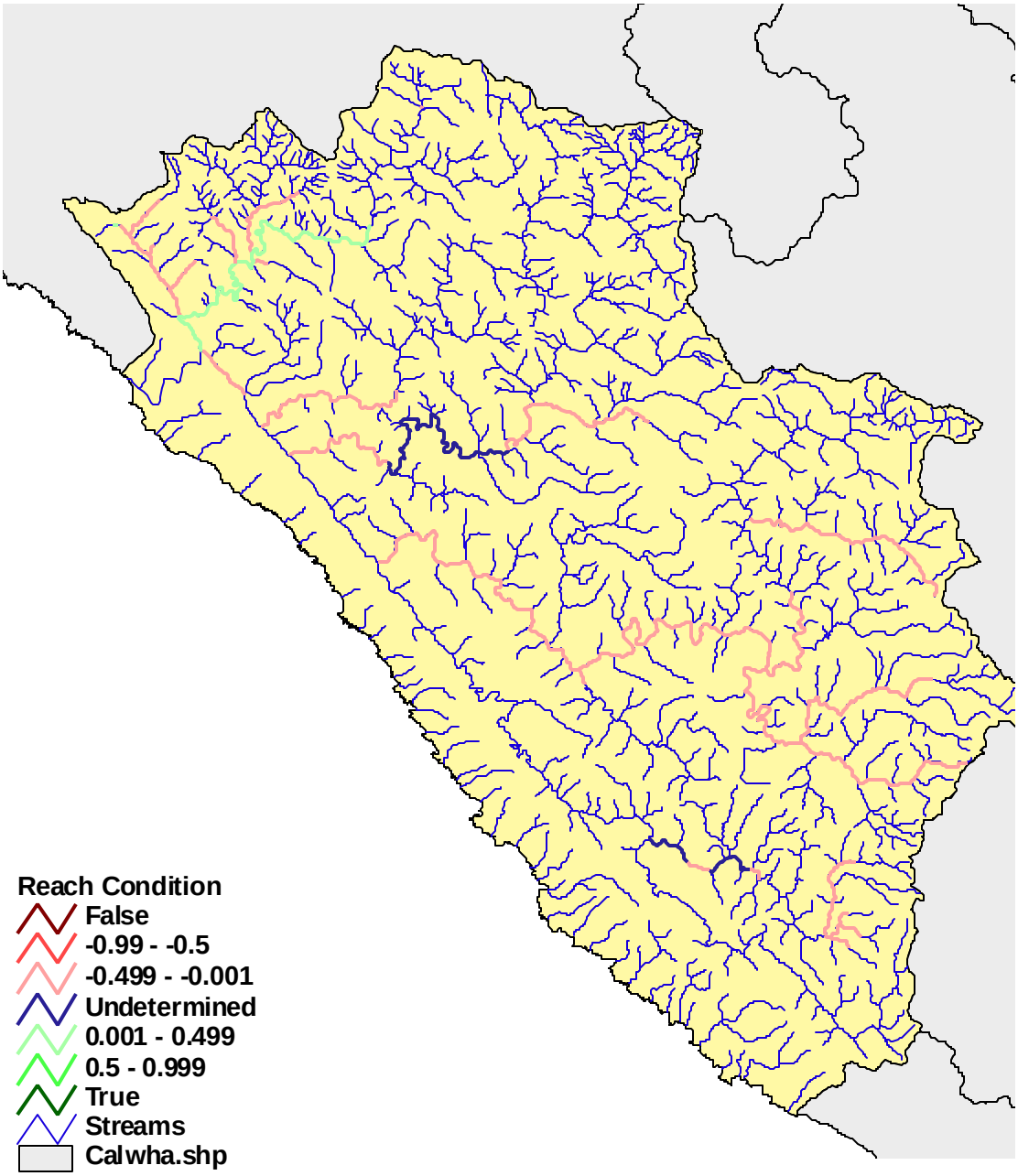
APPENDIX 10

EMDS KNOWLEDGE BASE SYSTEM RESULTS

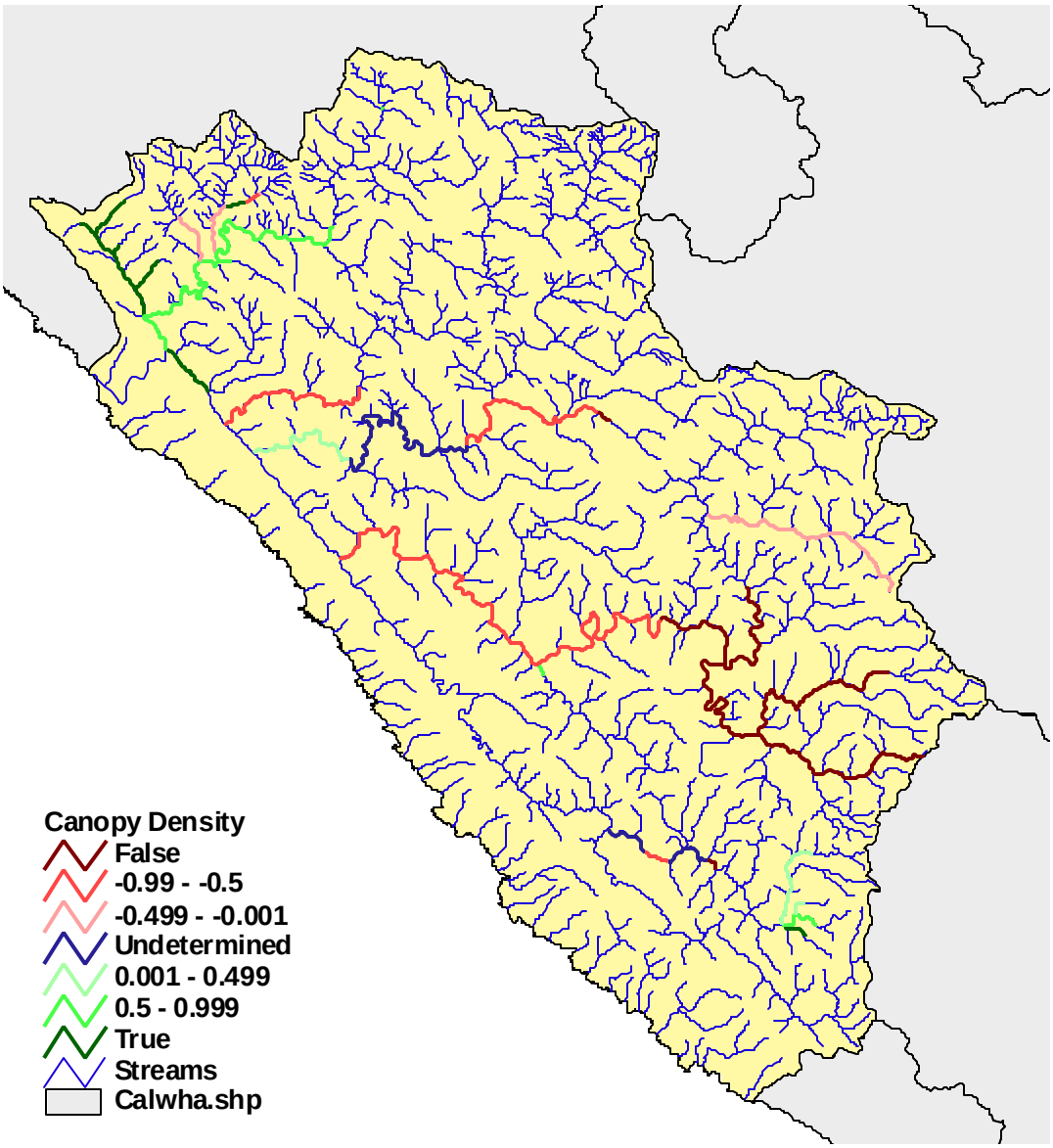
Reach Model

A draft summary explanation of the dependency curves is presented on the following pages. The preliminary model runs appear as maps, without explanation at this point.

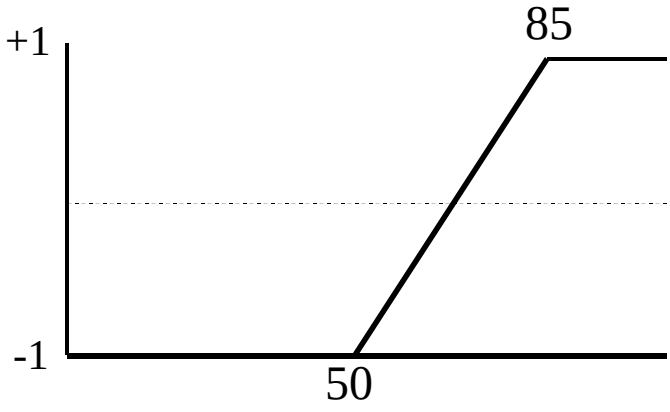
Reach Condition



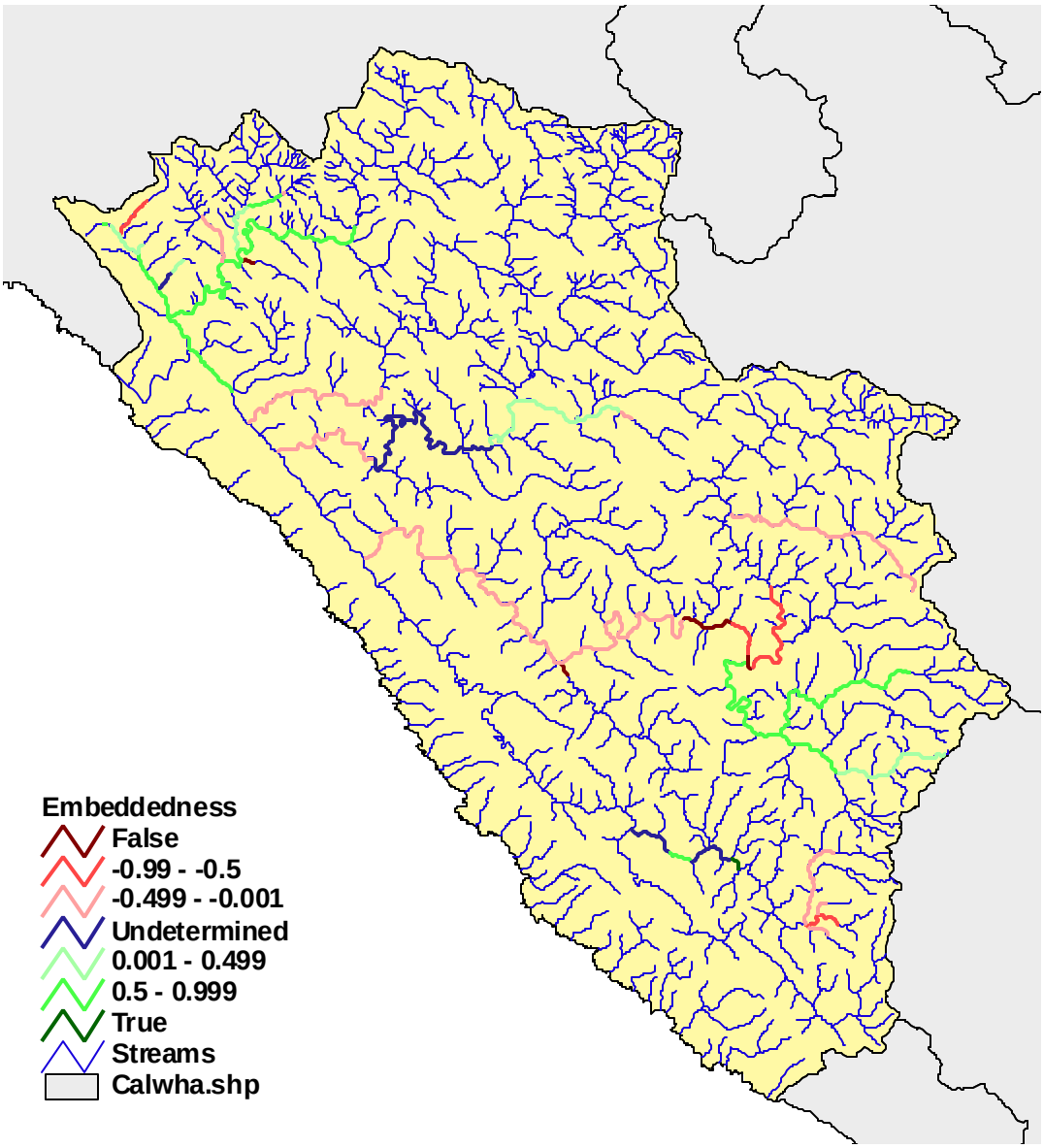
Canopy Density



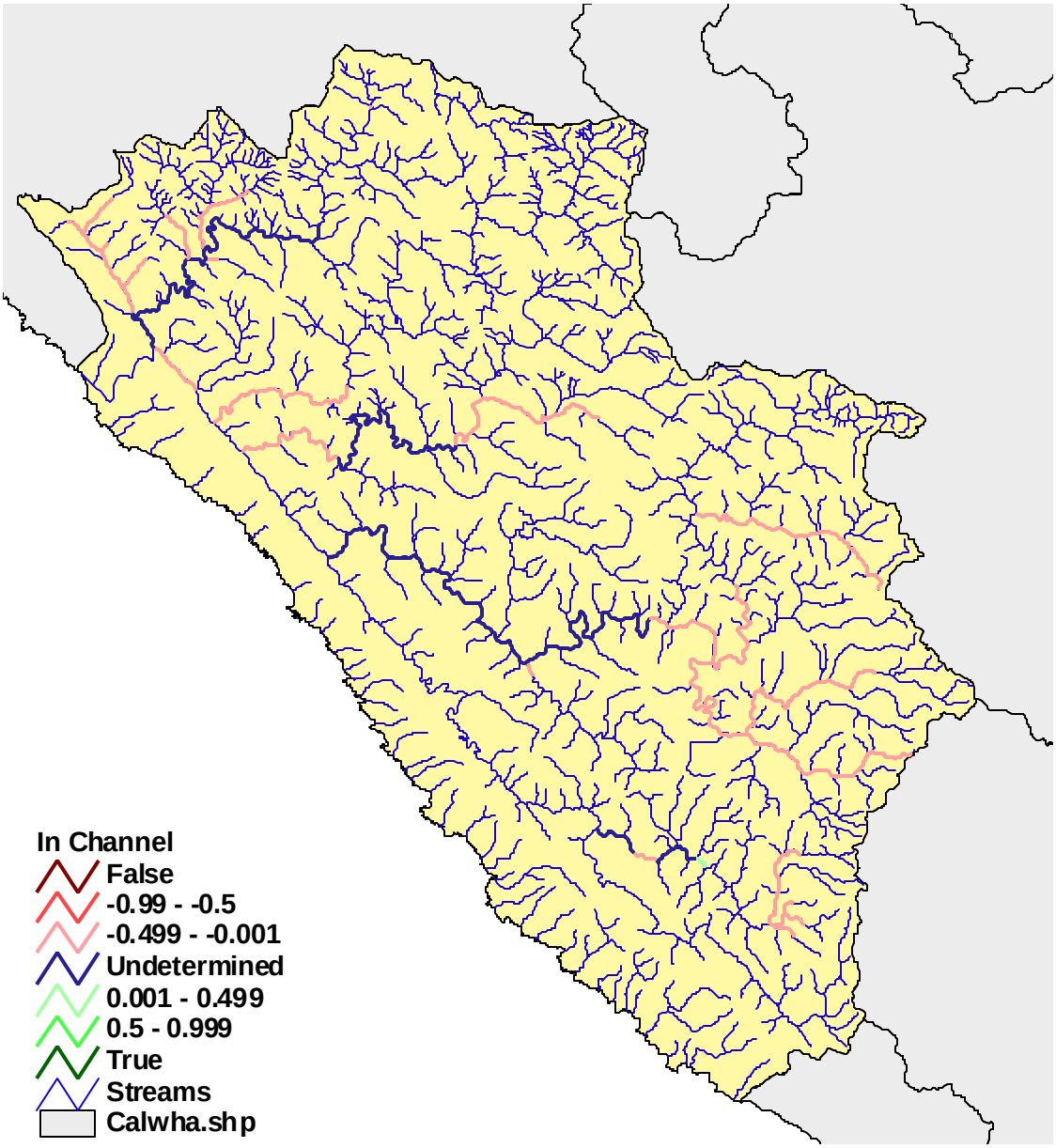
Percent Canopy Density



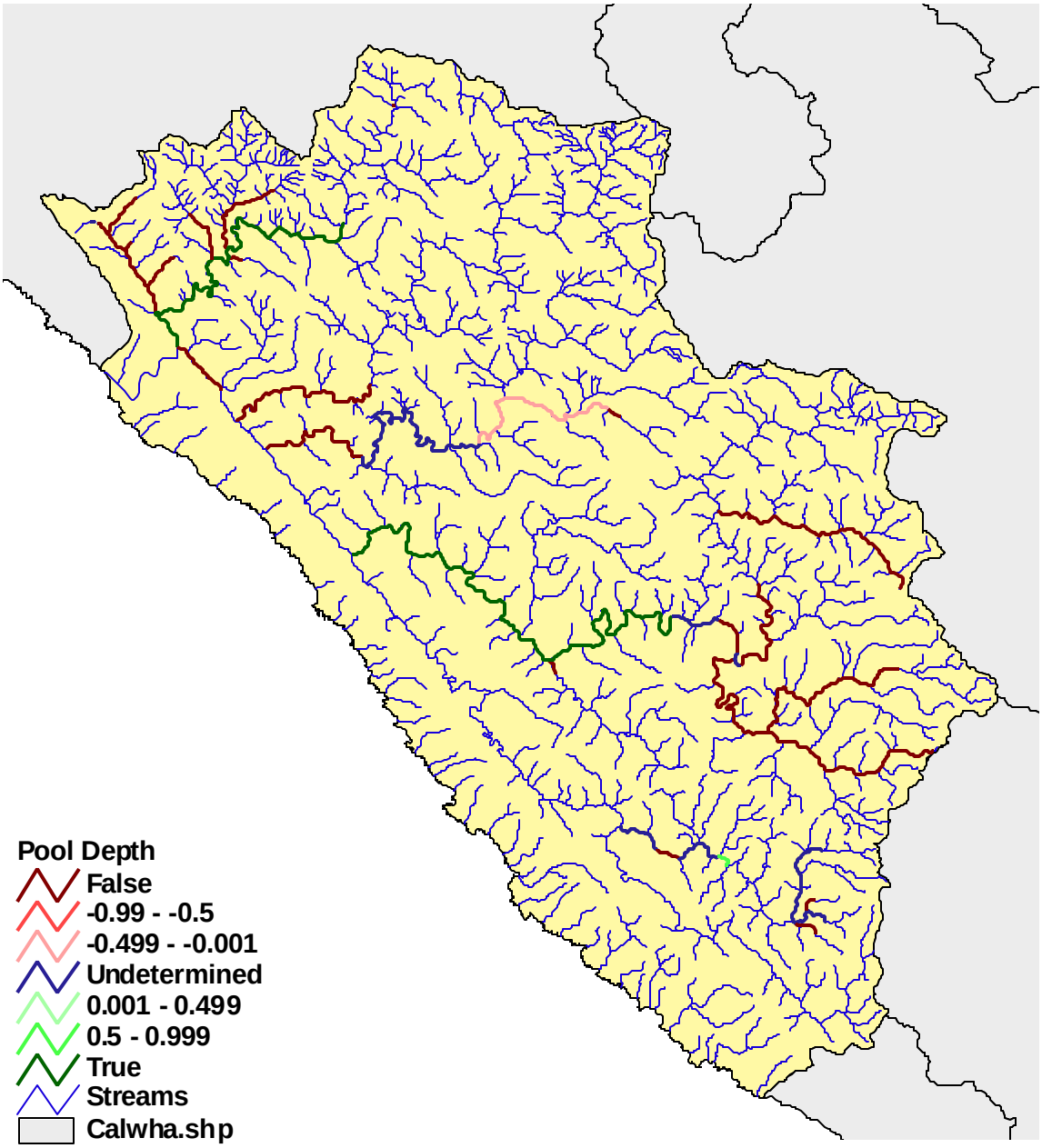
Embeddedness



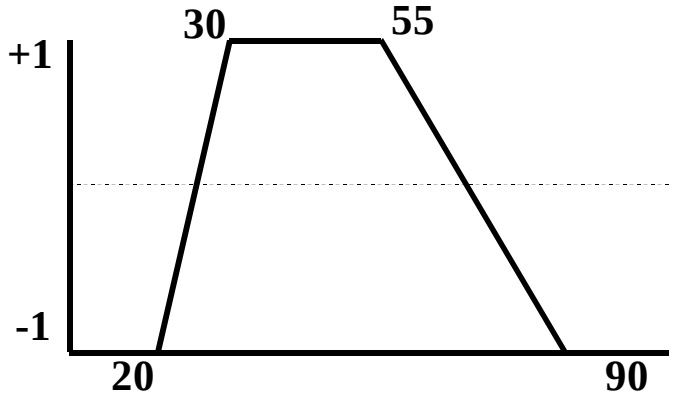
In Channel


In Channel
False
-0.99 - -0.5
-0.499 - -0.001
Undetermined
0.001 - 0.499
0.5 - 0.999
True
Streams
Calwha.shp

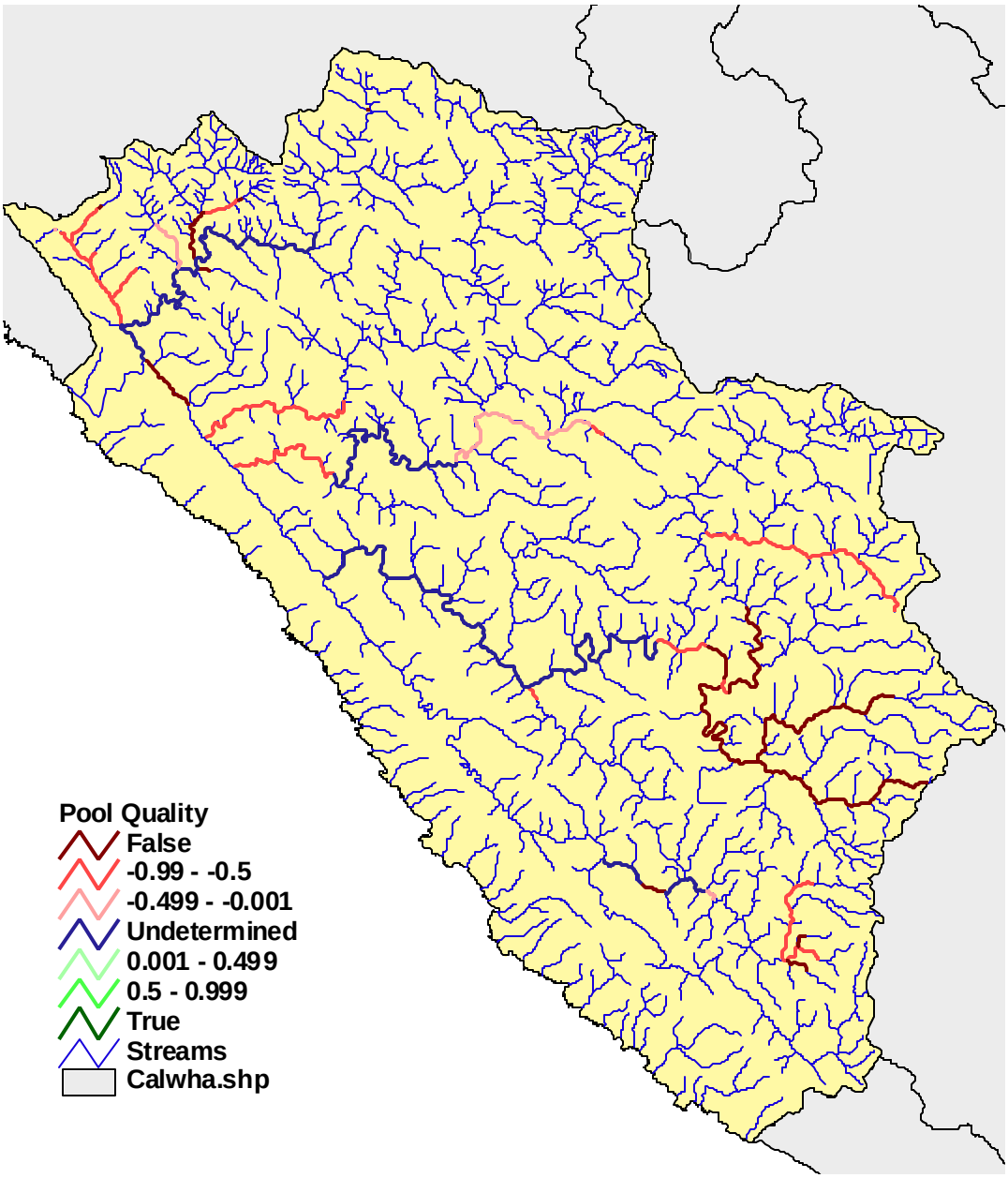
Pool Depth



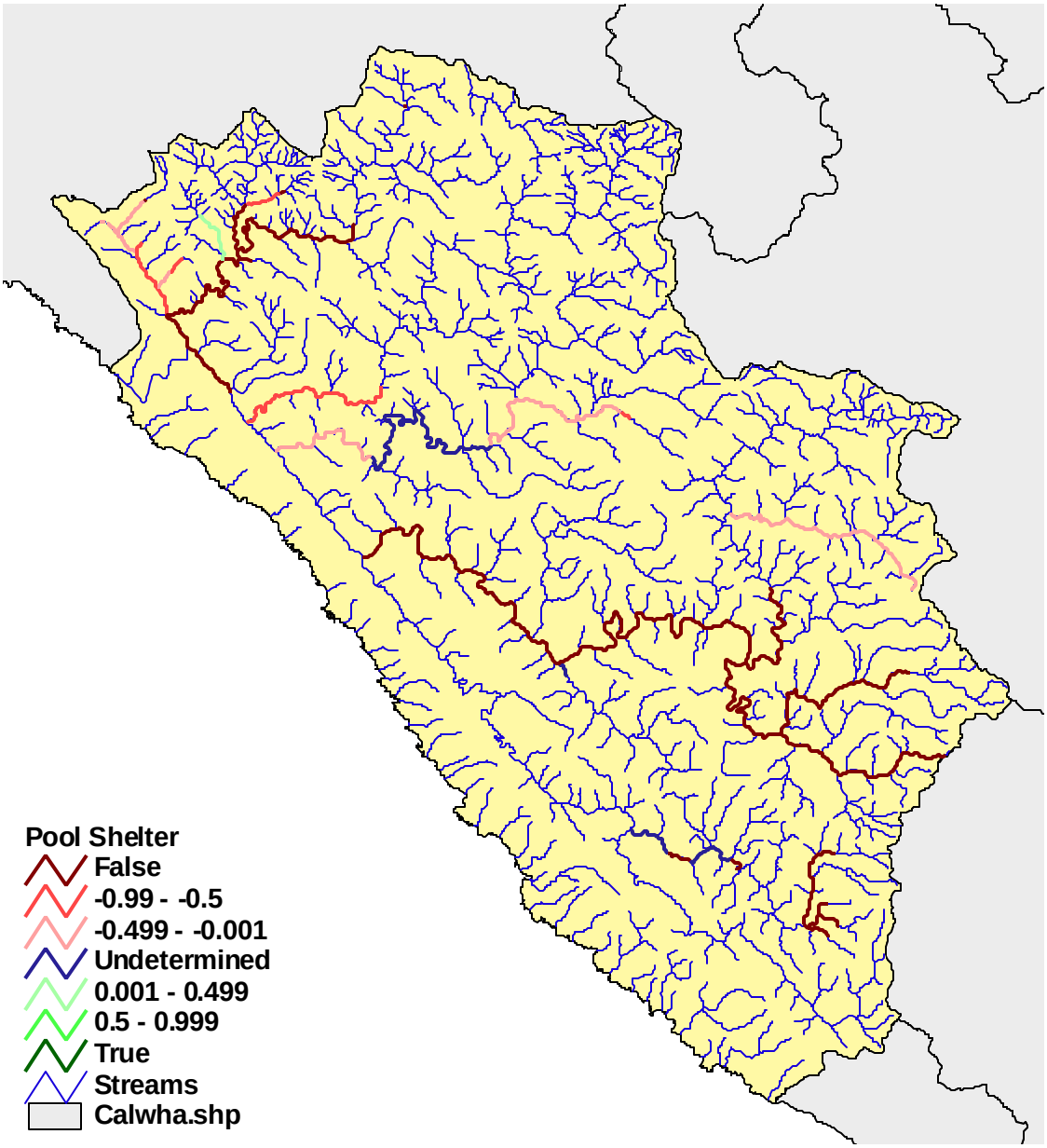
Percent Reach in Primary Pools



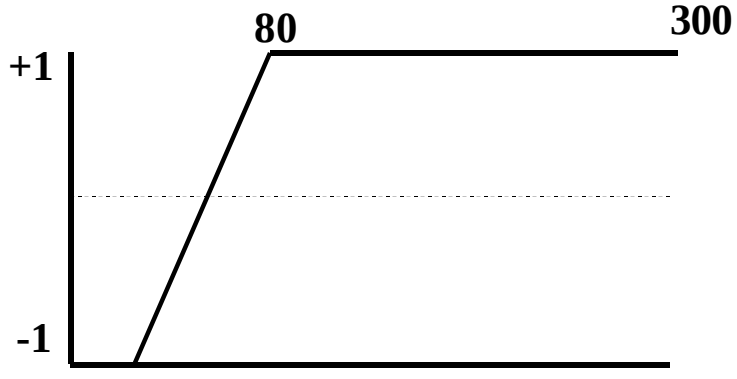
Pool Quality



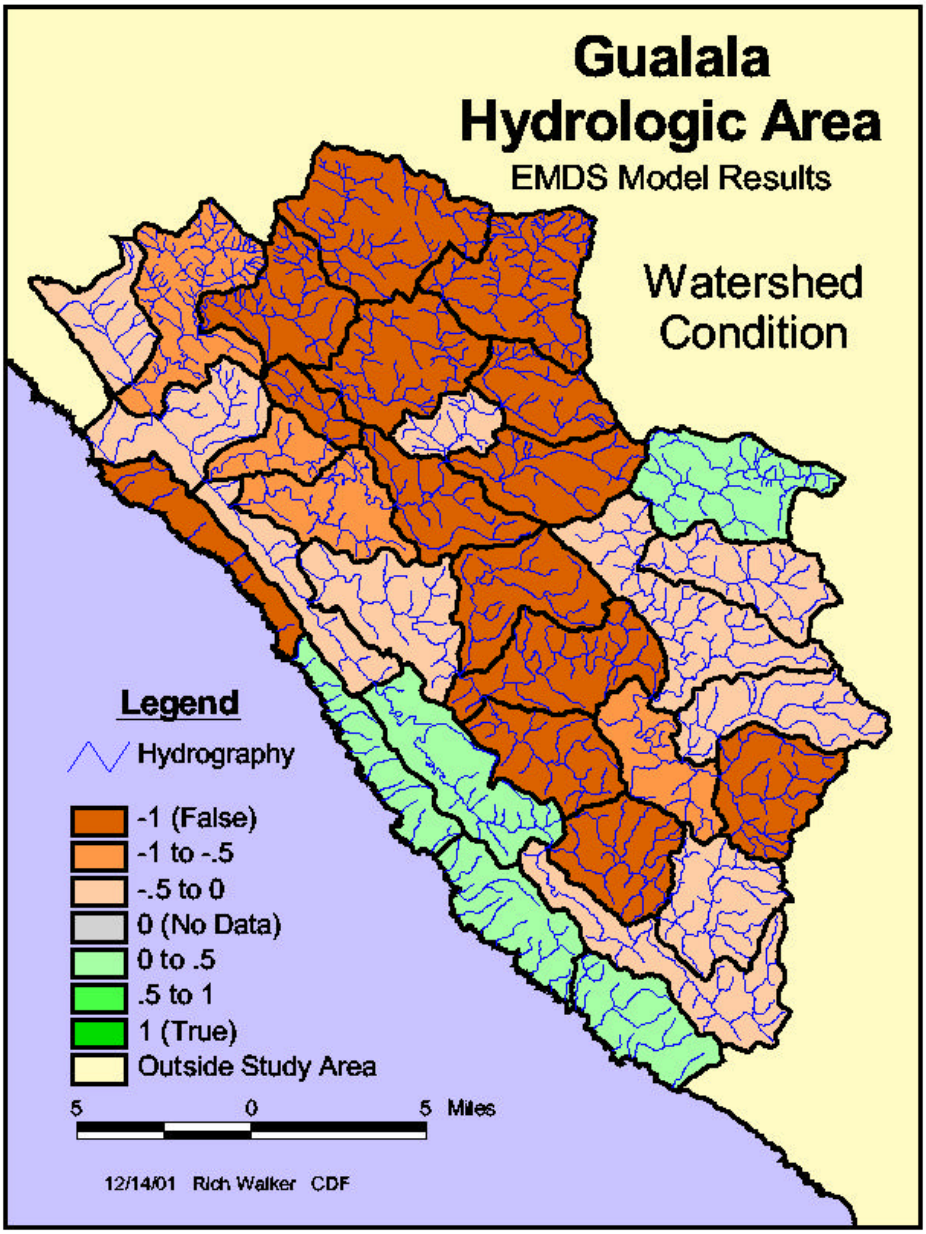
Pool Shelter Complexity



Pool Shelter Complexity



Watershed Model
The preliminary watershed model runs appear after the reach model runs as maps on the following pages with summary explanations.



WATERSHED CONDITION

Proposition:

Conditions in the Planning Watershed are suitable to sustain healthy populations of native anadromous salmonids

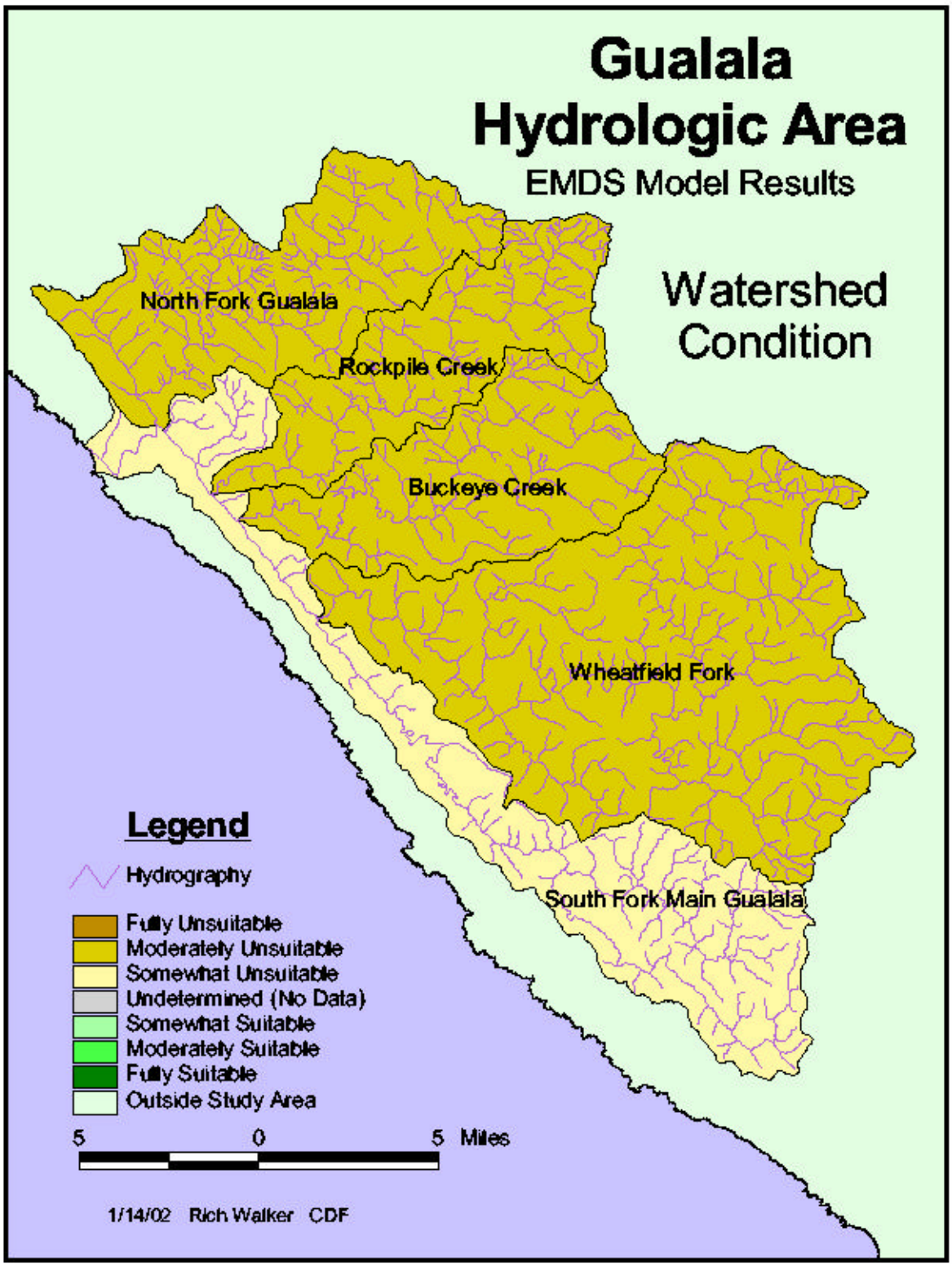
Evaluated by the following:

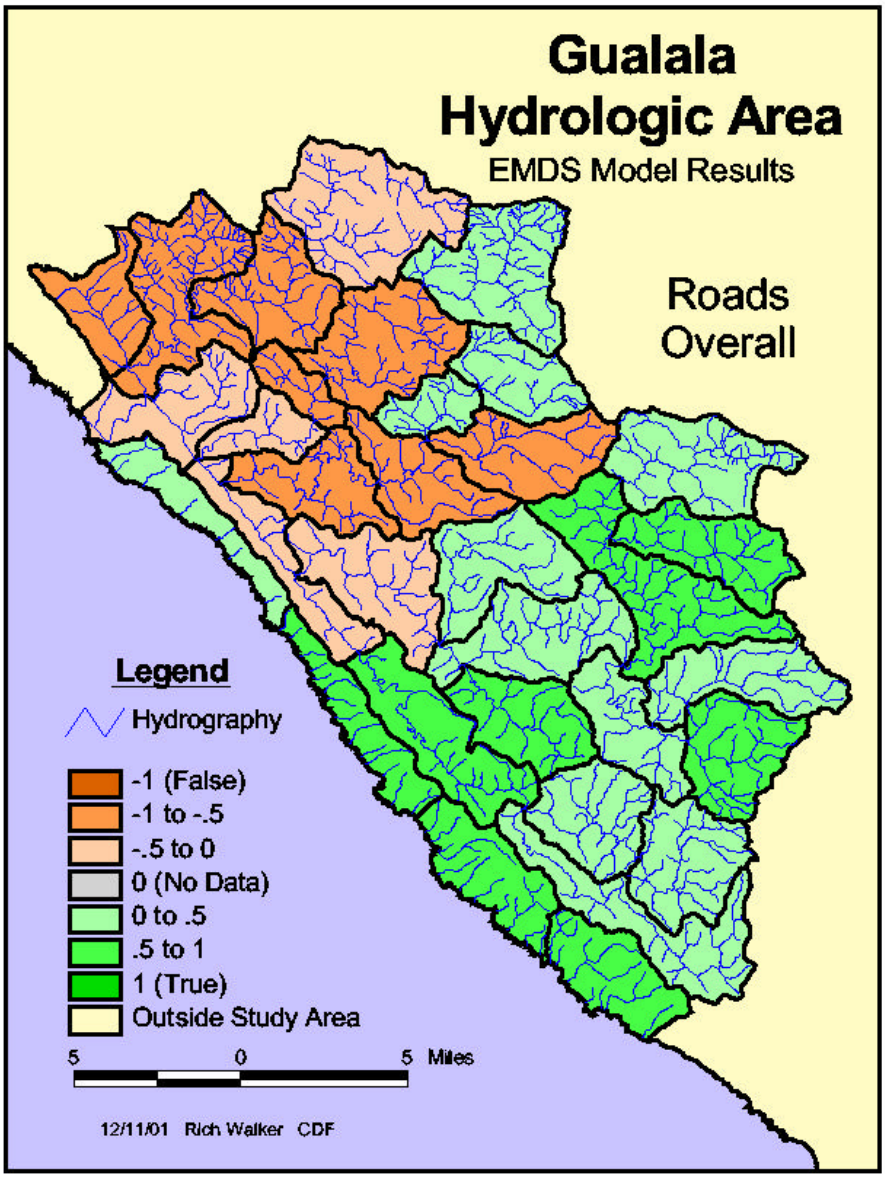
Combines all factors through an "AND" node to provide a comprehensive watershed condition score.

NOTE: Truth values at the highest levels represent the combined scores from lower level networks and thus are not calculated using a dependency curve.

NOTE: Includes preliminary results from Reach Model. Water Temperature is not represented in this model run.

EMDS Watershed Condition Sub-Basin Results.





ROADS OVERALL -

Proposition:

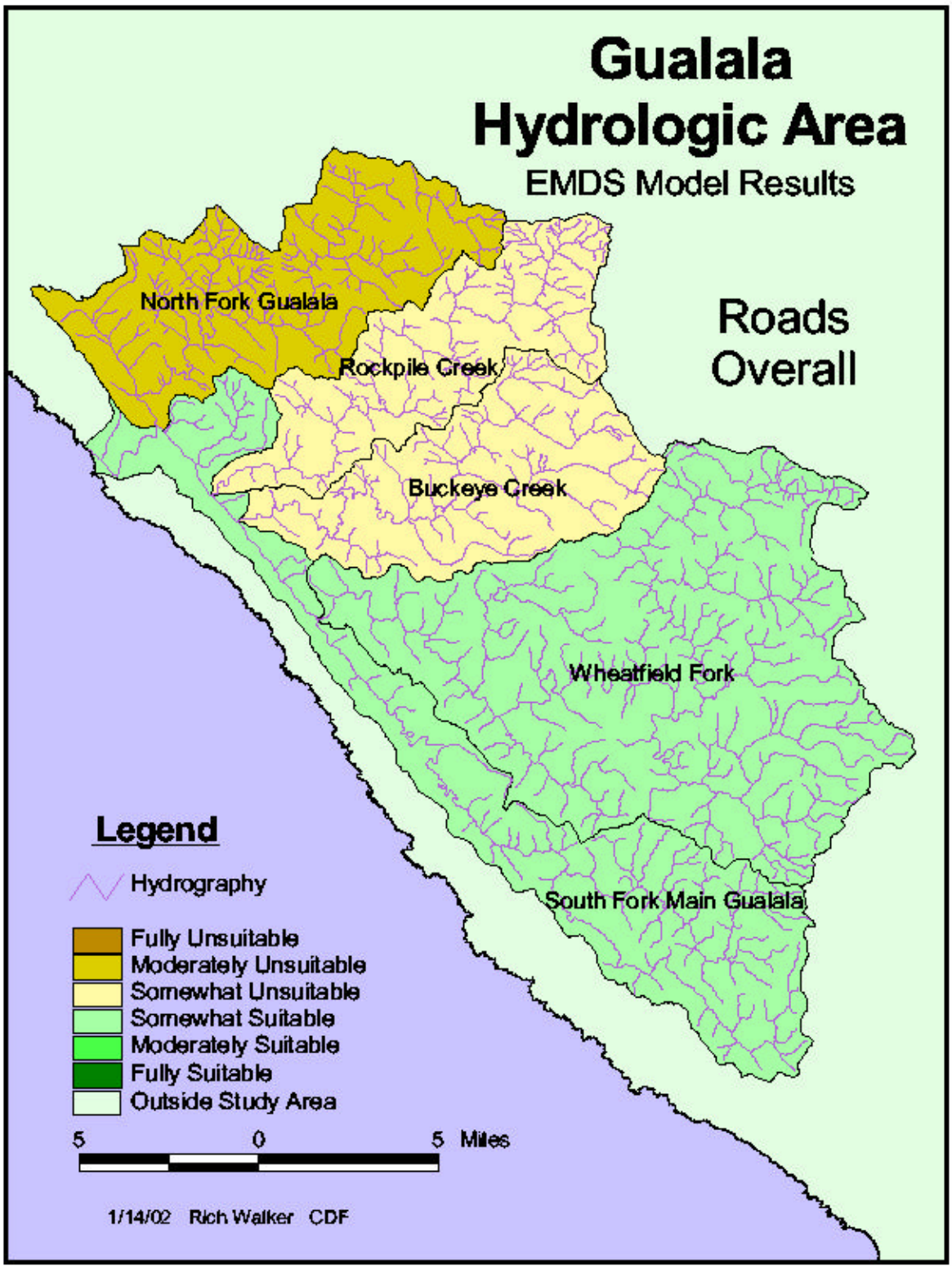
Roads in the Planning Watershed do not significantly impair its functioning for sustaining healthy populations of native anadromous salmonids

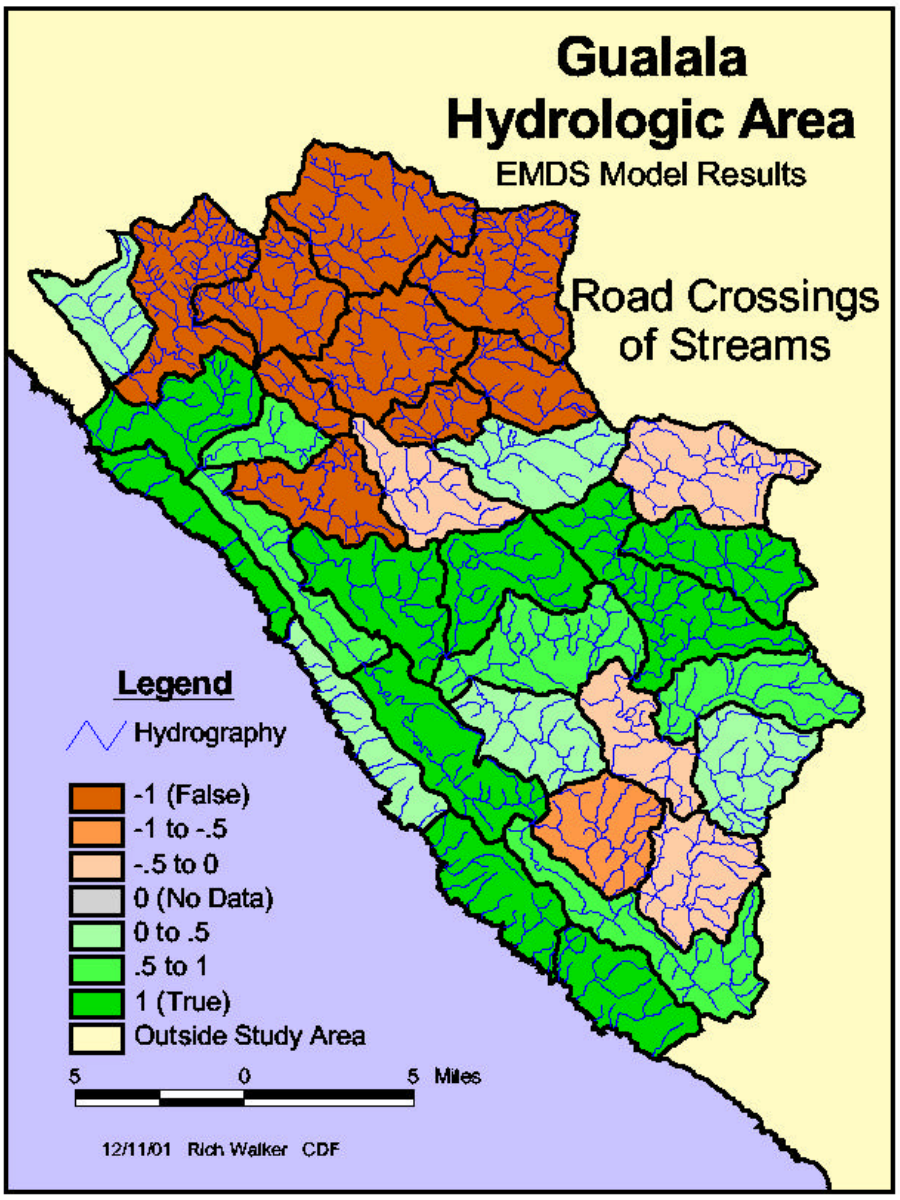
Evaluated by the following:

Combines all road factors through an "AND" node to provide a comprehensive road impact score.
Road impacts are evaluated using USGS 1:24k road and stream data.

NOTE: Truth values at the highest levels represent the combined scores from lower level networks and thus are not calculated using a dependency curve.

EMDS Roads Overall Sub-Basin Results





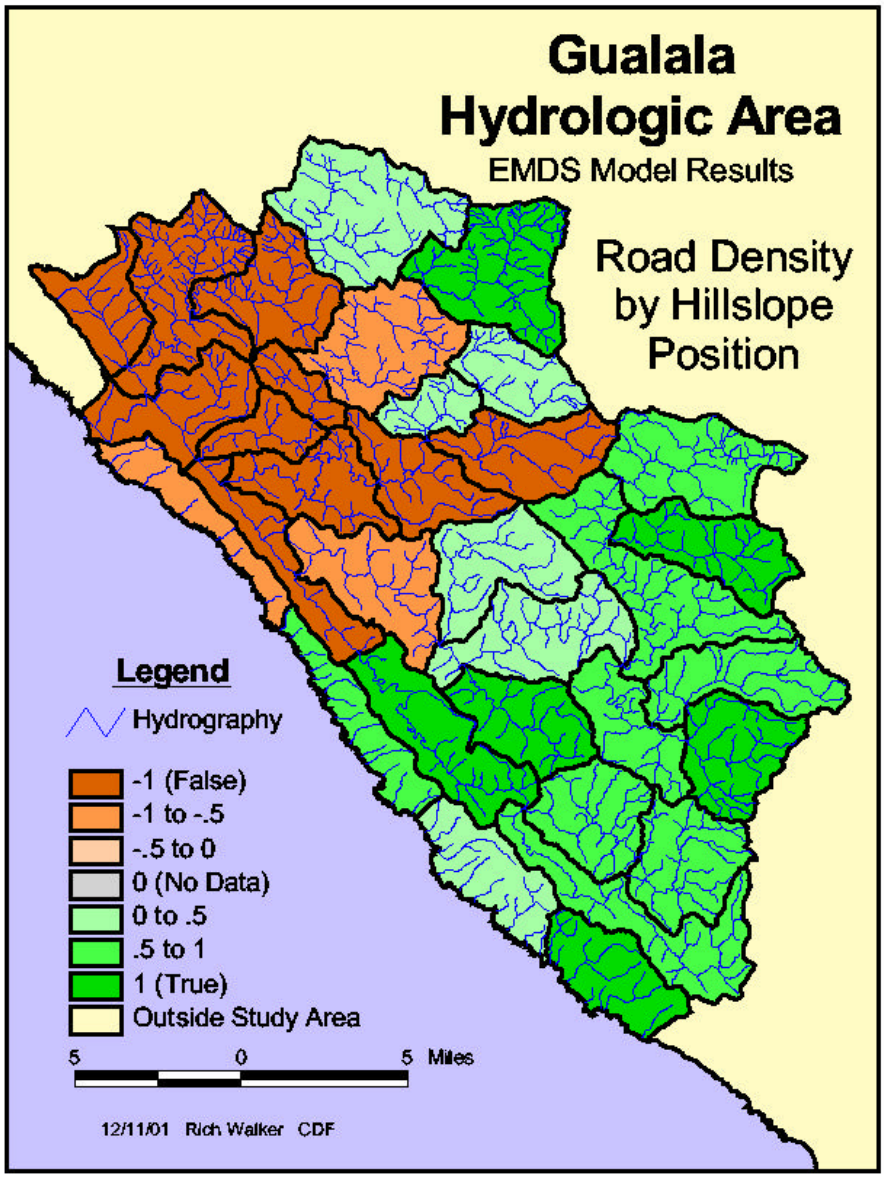
ROAD CROSSINGS OF STREAMS-

Proposition:

Number of road crossing of streams in the Planning Watershed do not significantly impair its functioning for sustaining healthy populations of native anadromous salmonids

Evaluated by the number of crossings per kilometer of stream using USGS 1:24k road and stream data.

Break Points: 0 low, 1 high
Units: # of crossings per km



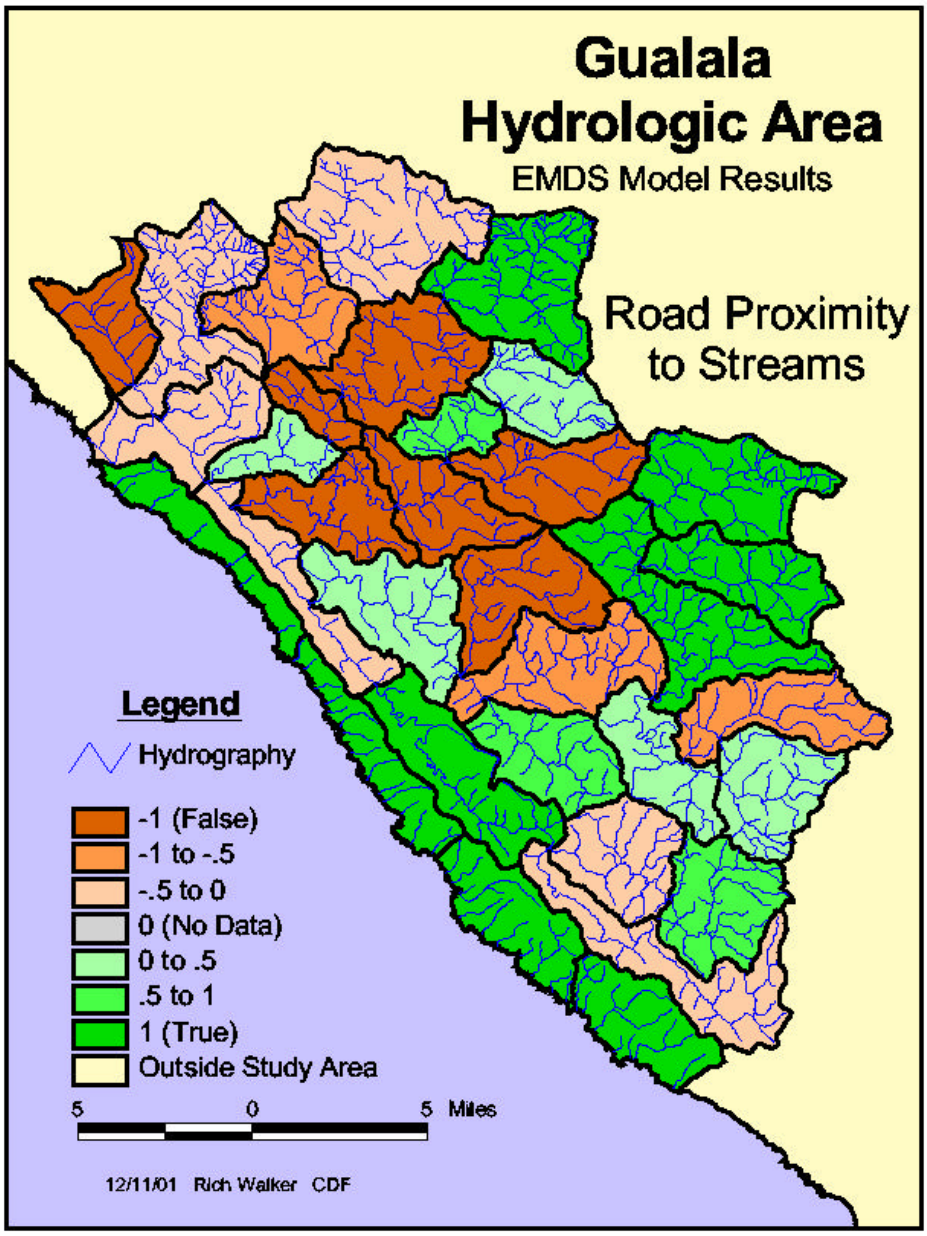
ROAD DENSITY BY HILLSLOPE POSITION

Proposition:

Road densities by hillslope position Planning Watershed do not significantly impair its functioning for sustaining healthy populations of native anadromous salmonids

Weighted by 3 classes of hillslope positions. Evaluated using USGS 10m DEMs,1:24k road and stream data.

Break Points: 1 low, 3 high
Units: km/km^2.



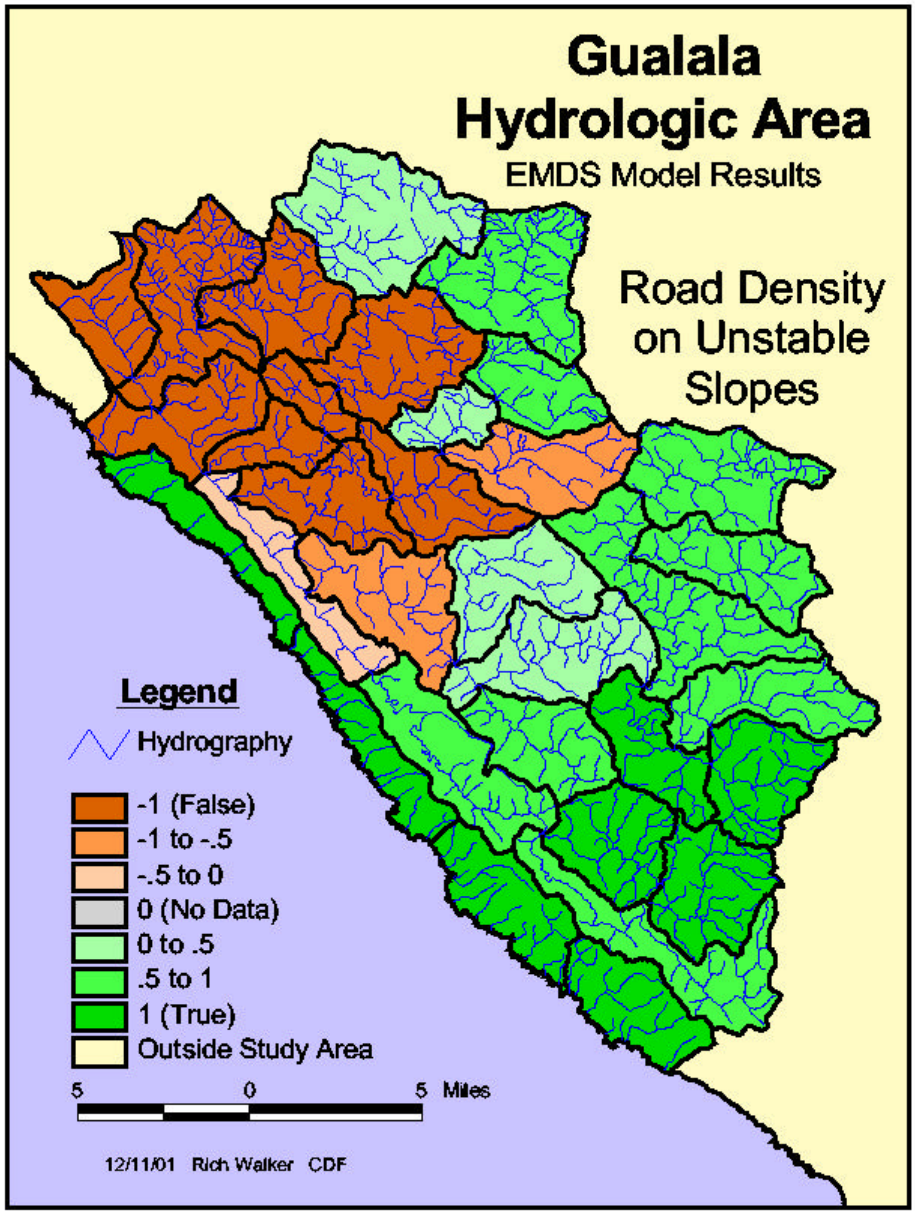
ROAD PROXIMITY TO STREAMS-

Proposition:

Roads proximate to streams in the Planning Watershed do not significantly impair its functioning for sustaining healthy populations of native anadromous salmonids

Uses USGS 1:24k road and stream data. Evaluates percent of stream length, in a planning watershed that has a road within 200 ft.

Break Points: 0% low, 10% high
Units: km/km (%)



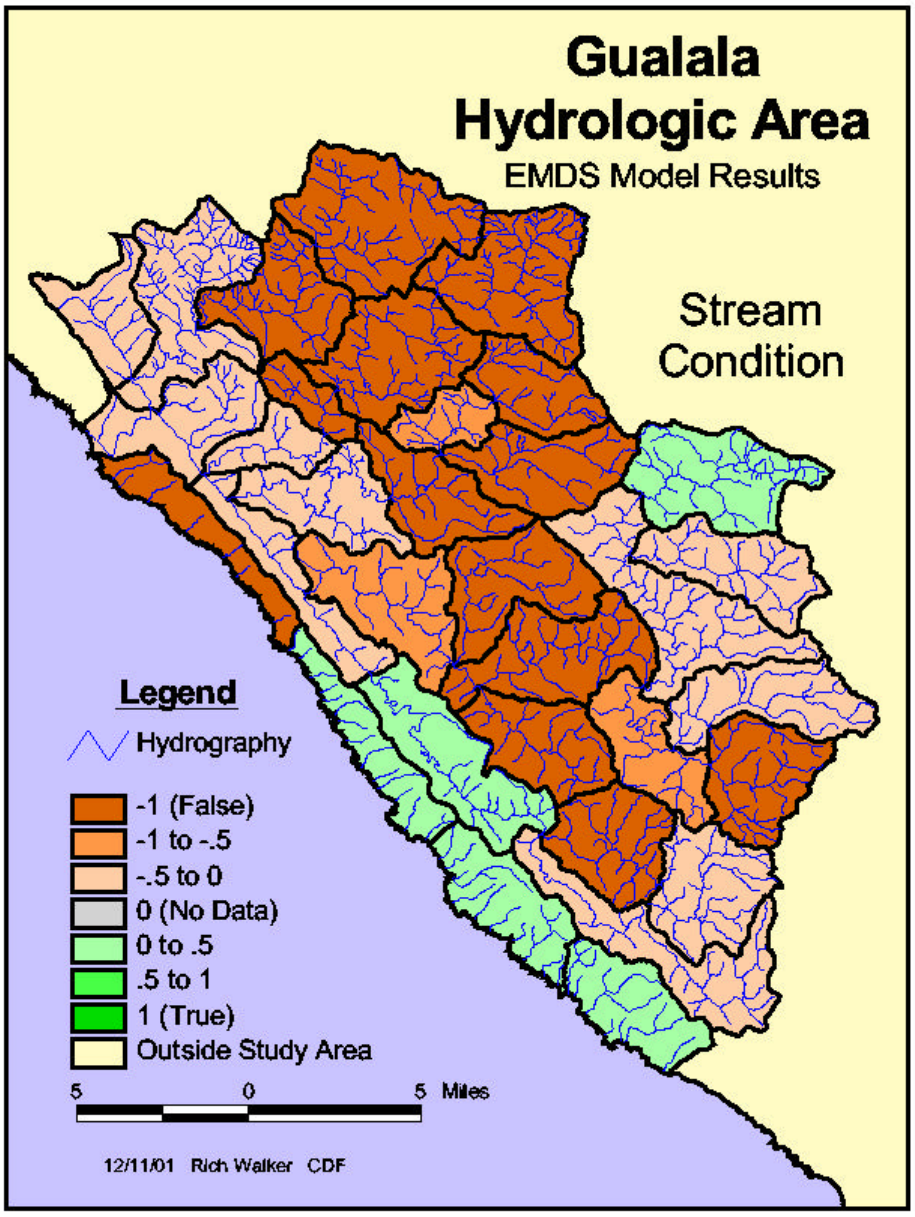
ROADS on POTENTIALLY UNSTABLE SLOPES -

Proposition:

Roads on potentially unstable slopes in the Planning Watershed do not significantly impair its functioning for sustaining healthy populations of native anadromous salmonids

Assessed using USGS 1:24k road data and SHALSTAB classes, where log q/T values are <= -2.8. Evaluates the density of roads crossing potentially unstable slopes.

Break Points: 0.0437 low, 0.0765 high
Units: km / km^2



STREAM CONDITION -

Proposition:

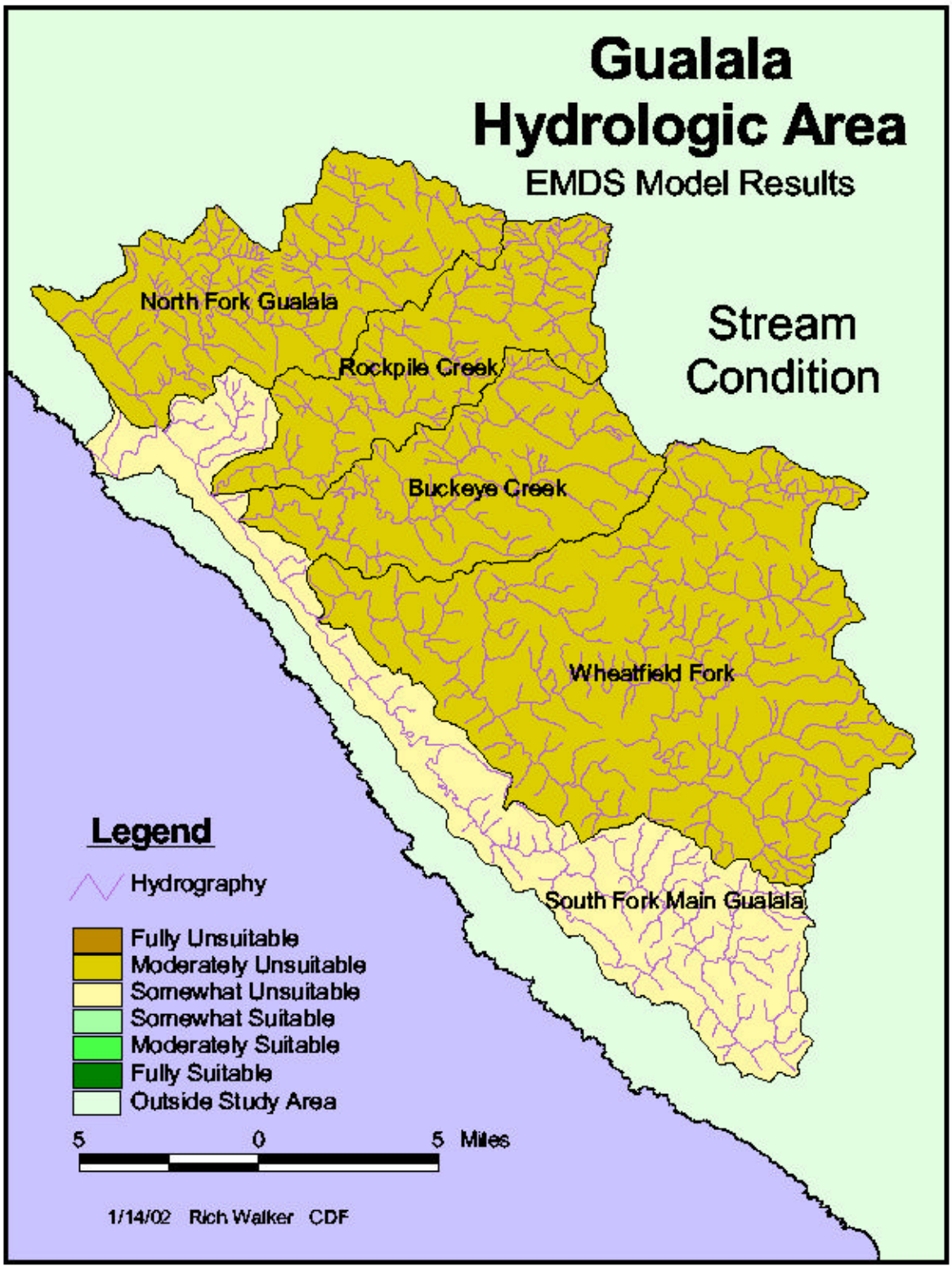
Stream reach conditions in the Planning Watershed are suitable for sustaining healthy populations of native anadromous salmonids

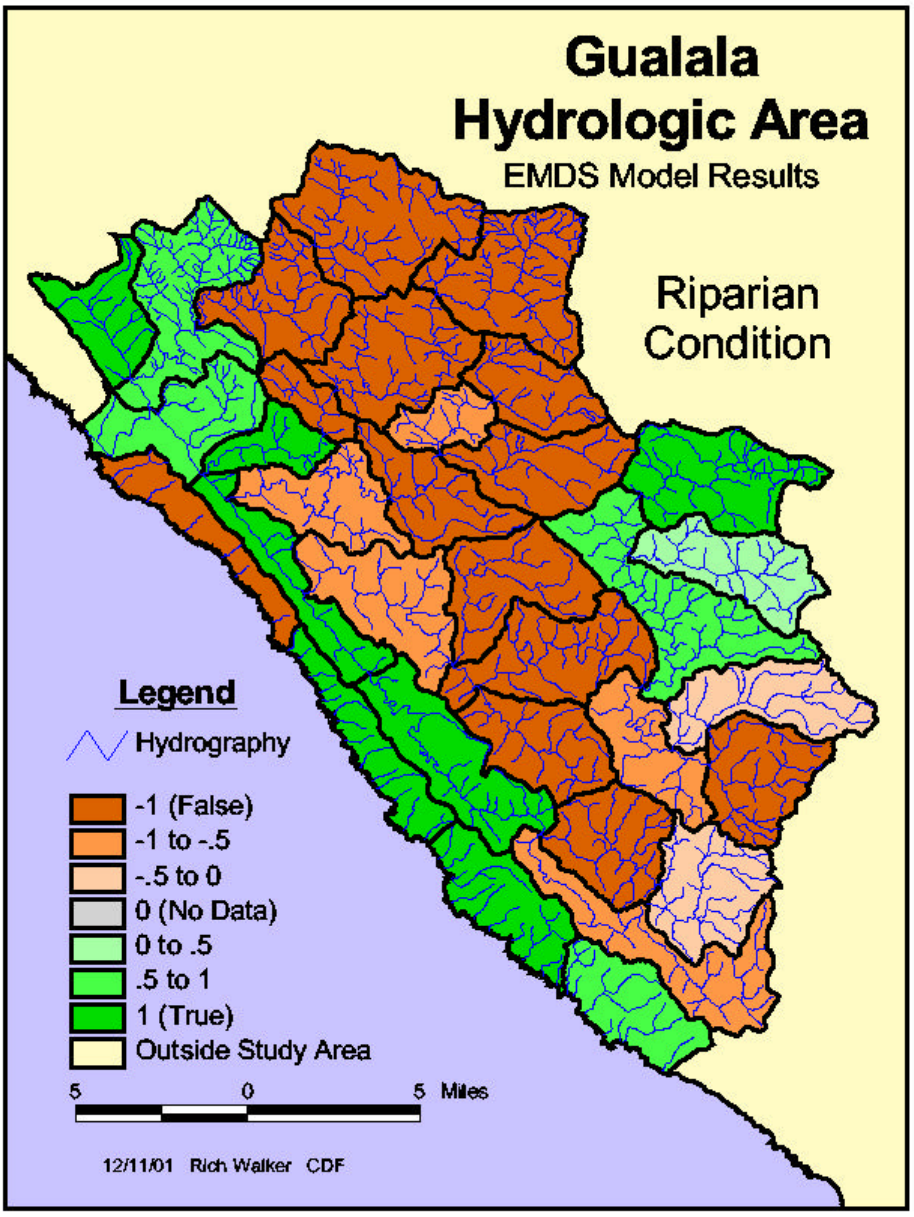
Evaluated by the following parameters.

REACH CONDITION
From the Reach Model – length-weighted condition of stream reaches in the planning watershed.

STREAM FLOW
Currently we have no data for this parameter

RIPARIAN CONDITION
The minimum condition of Riparian Canopy and Large Woody Debris Potential


Gualala
Hydrologic Area
EMDS Model Results
Stream
Condition
North Fork Gualala
Rockpile Creek
Buckeye Creek
Wheatfield Fork
South Fork Main Gualala
Legend
Hydrography
Fully Unsuitable
Moderately Unsuitable
Somewhat Unsuitable
Somewhat Suitable
Moderately Suitable
Fully Suitable
Outside Study Area
5 0 5 Miles
1/14/02 Rich Walker CDF



RIPARIAN CONDITION -

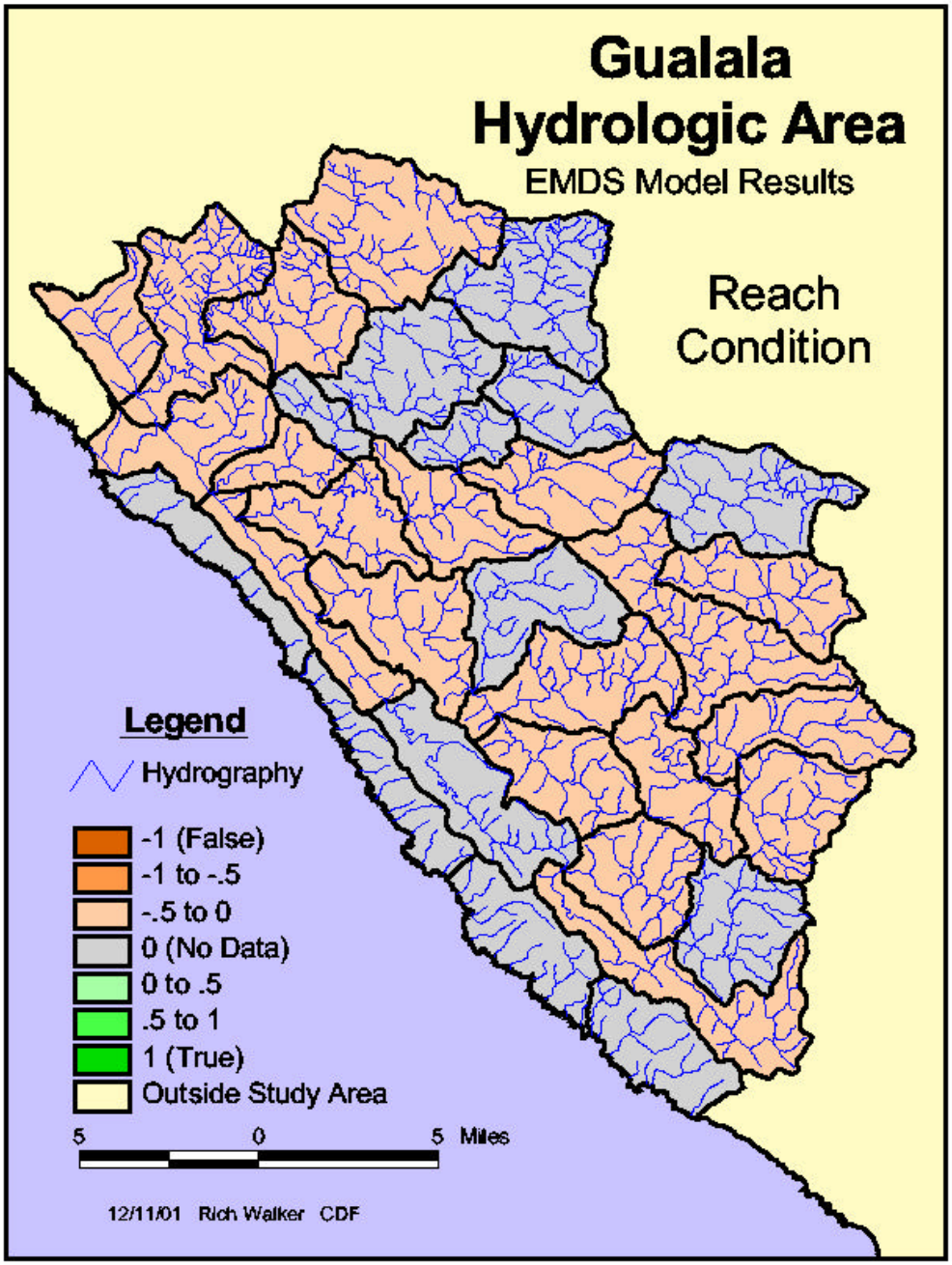
Proposition:

Riparian conditions in the Planning Watershed are suitable for sustaining healthy populations of native anadromous salmonids

Evaluated as the most restrictive of two parameters.

LARGE WOODY DEBRIS POTENTIAL
Percentage of stream (in a planning watershed) bordered by mature forest stands where average tree size
is >= 24" dbh.

RIPARIAN CANOPY COVER
Percent of stream (in a planning watershed) bordered by forest stands that exceed 70% canopy cover.



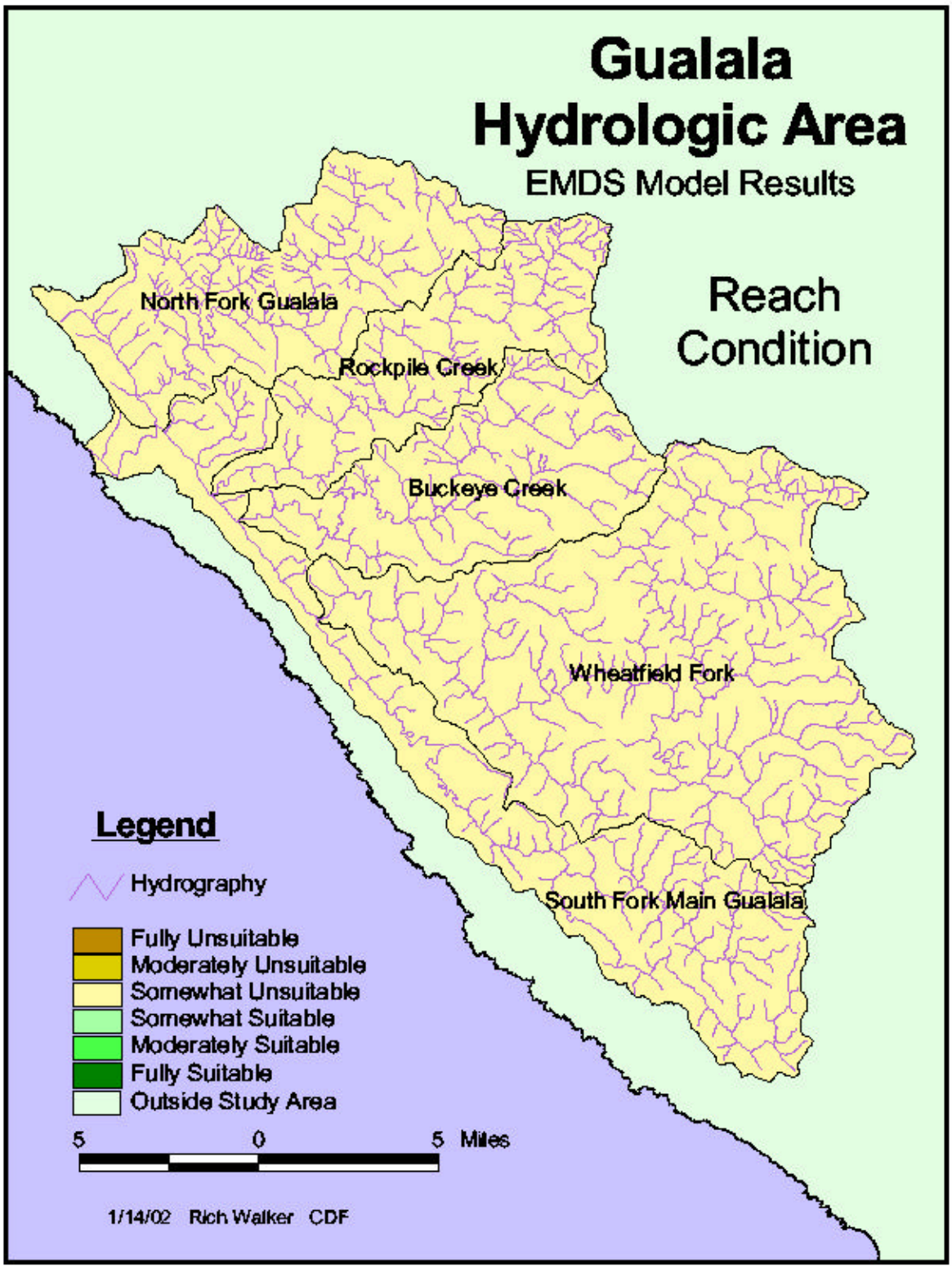
REACH CONDITION

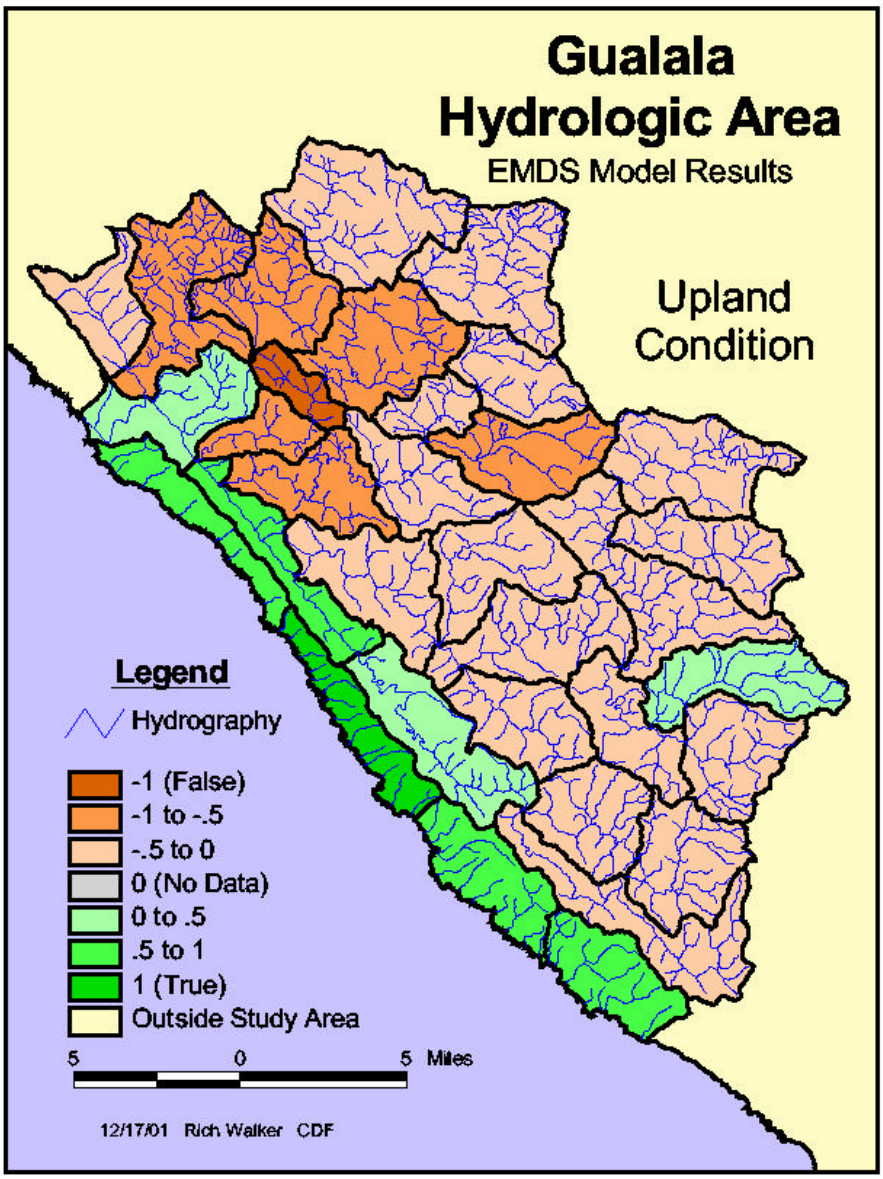
Proposition:

Conditions in the stream reaches in the Planning Watershed are suitable for sustaining healthy populations of native anadromous salmonids

Evaluated by the Reach EMDS Model, using truth values weighted by reach length.

EMDS Reach Condition Sub-Basin Results





UPLAND CONDITION –

Proposition:

The condition of the upland in the Planning Watershed is suitable for sustaining healthy populations of native anadromous salmonids

Evaluated as the mean value of:

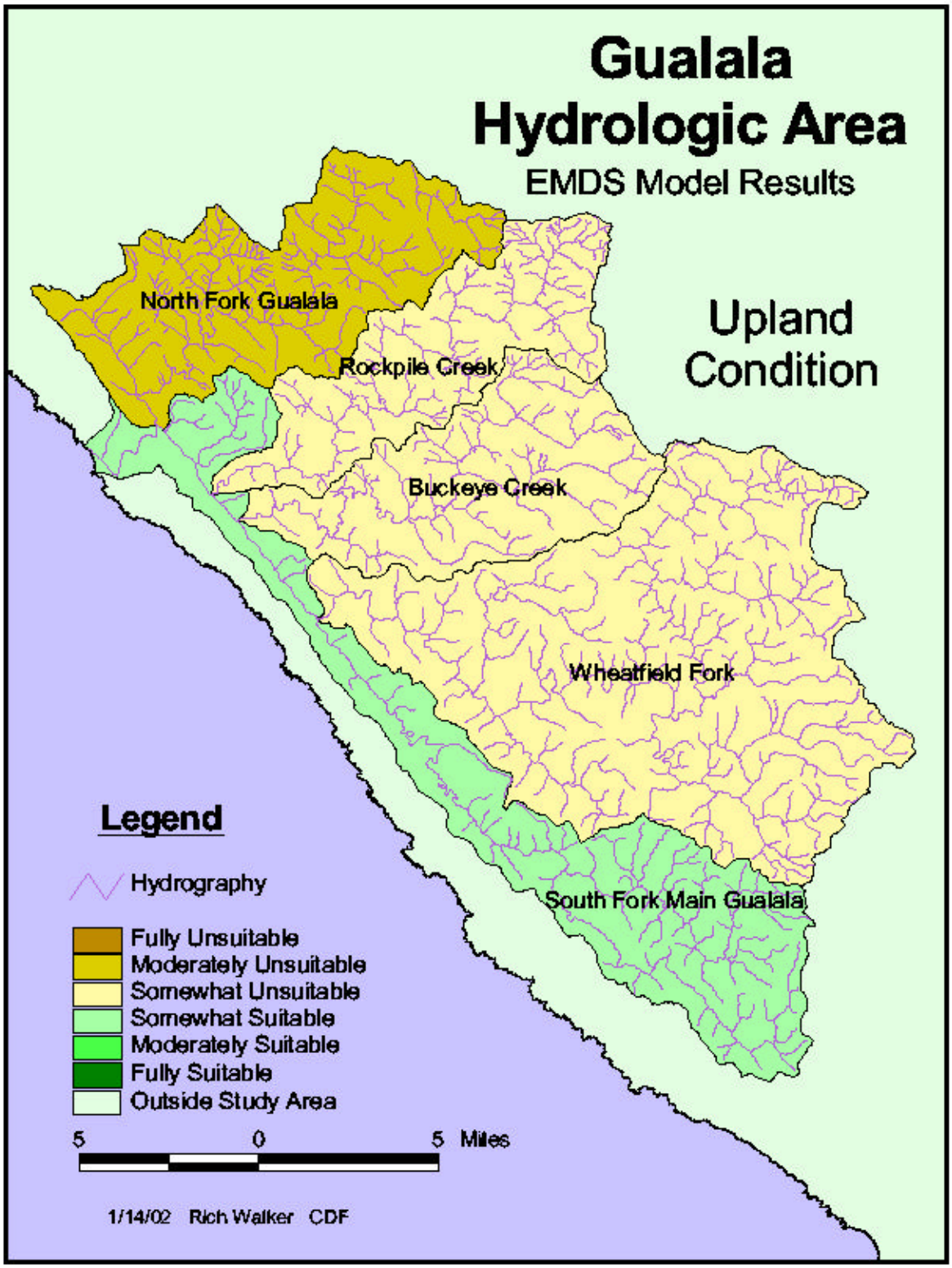
UPLAND COVER – from Canopy and Seral Openings

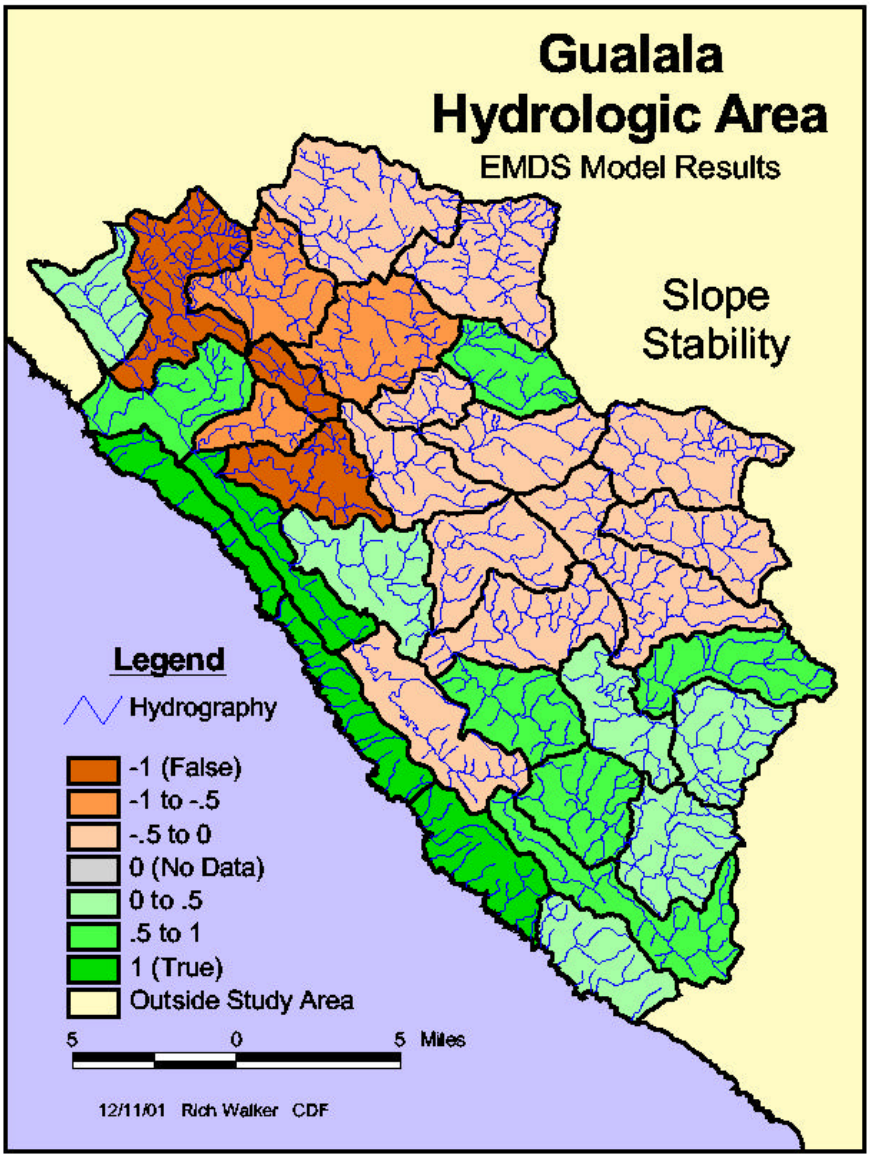
LAND USE – from current intensive and extensive land use, and recent and historic timber harvest

SLOPE STABILITY – % area of unstable slopes

NOTE: Truth values at the highest levels represent the combined scores from lower level networks and thus are not calculated using a dependency curve.

EMDS Upland Condition Sub-Basin Results





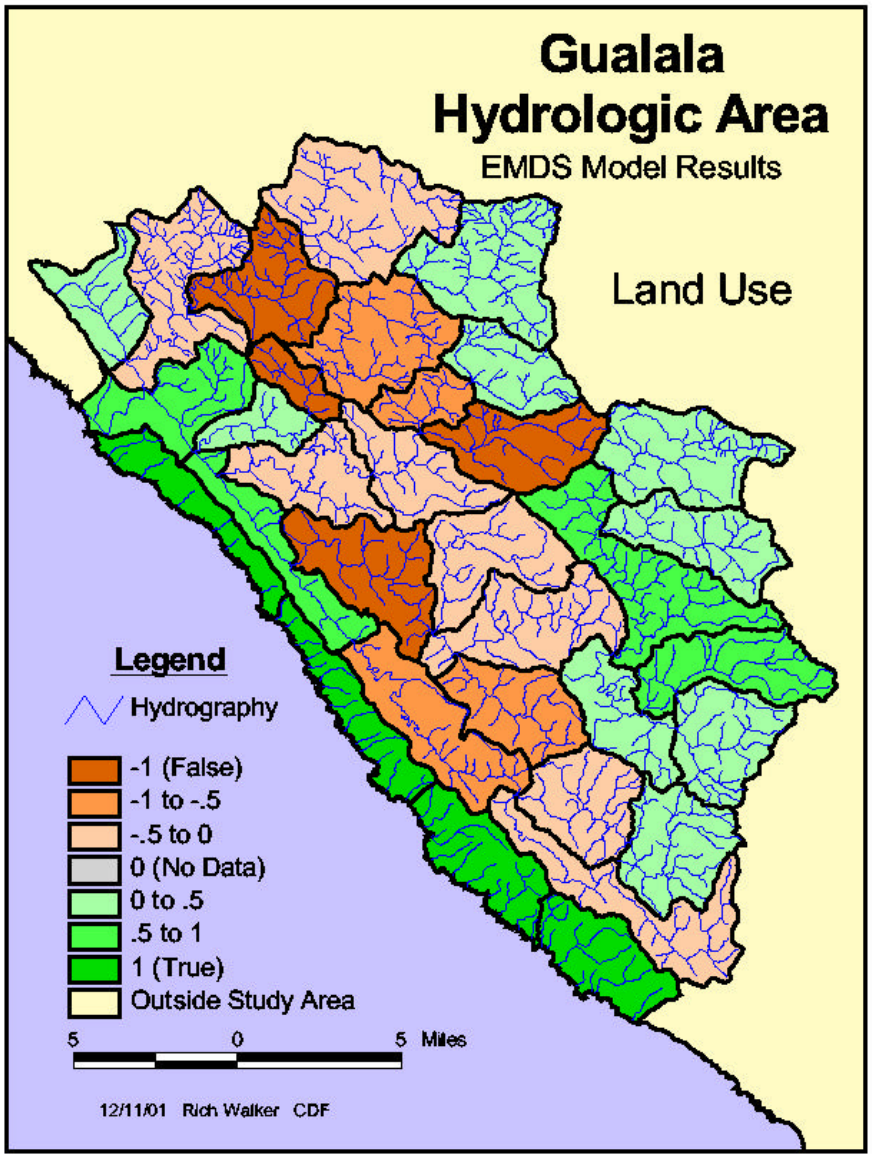
SLOPE STABILITY -

Proposition:

The natural slope stability in the Planning Watershed is suitable for sustaining healthy populations of native anadromous salmonids

Percentage of the planning watershed with significant erosion hazard. Potential unstable slopes are currently defined using SHALSTAB classes (q/T ratio), where log(q/T) <= -2.8.

Break Points: 12% low, 18% high
Units: area/area (%)



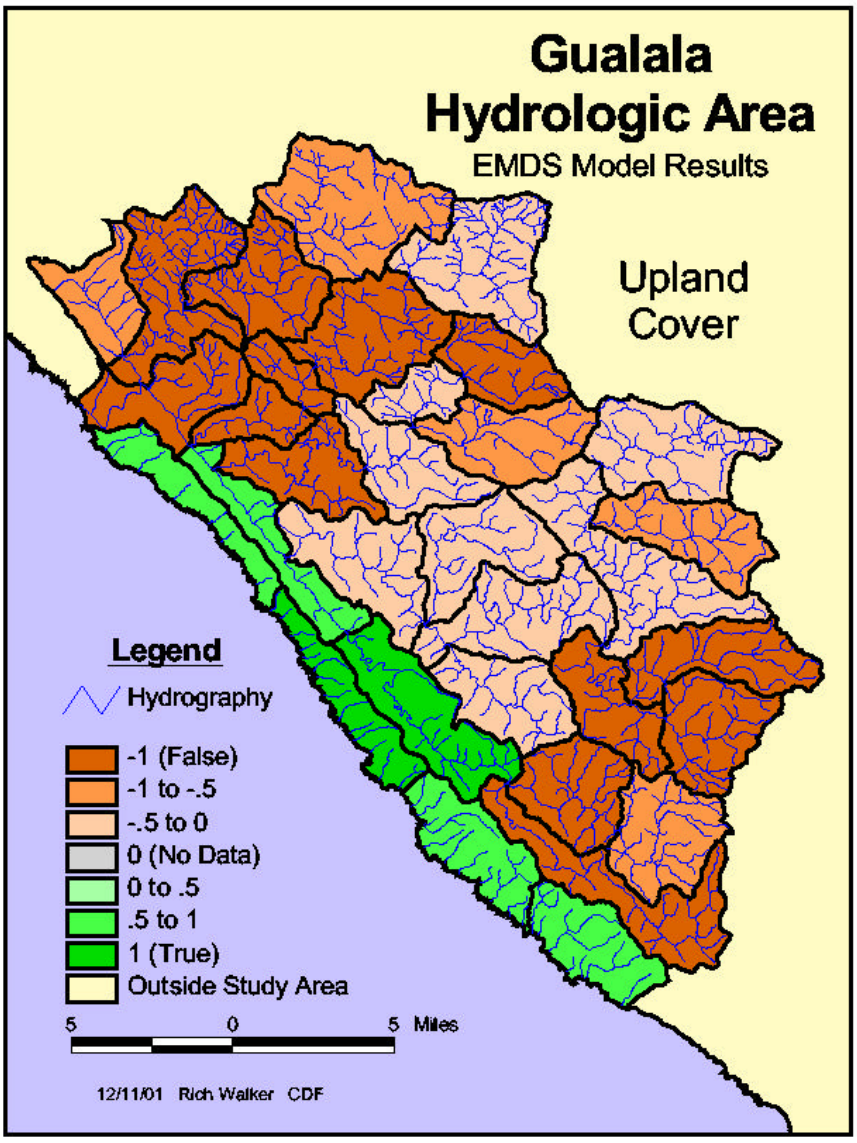
LAND USE –

Proposition:
Current and historic land use in the Planning Watershed are suitable for sustaining healthy populations of native anadromous salmonids

Percentages of the land area of the watershed are split up by potential slope stability (stable vs. unstable) and weighted by intensity (f(time since occurrence, activity)).
INTENSIVE – current permanent high density roads and buildings and row crop cultivation
TIMBER HARVEST – tractor logged and yarded, according to era:

- Last two years
- 1990 through 1999
- 1973 through 1989
- 1945 through 1972
- Prior to 1945

EXTENSIVE – current livestock use
Truth values were determined by fitting normal distribution to planning watershed land use values, then mapping 0^{th} percentile to +1 (true) and 100^{th} percentile to –1 (false).



UPLAND COVER –

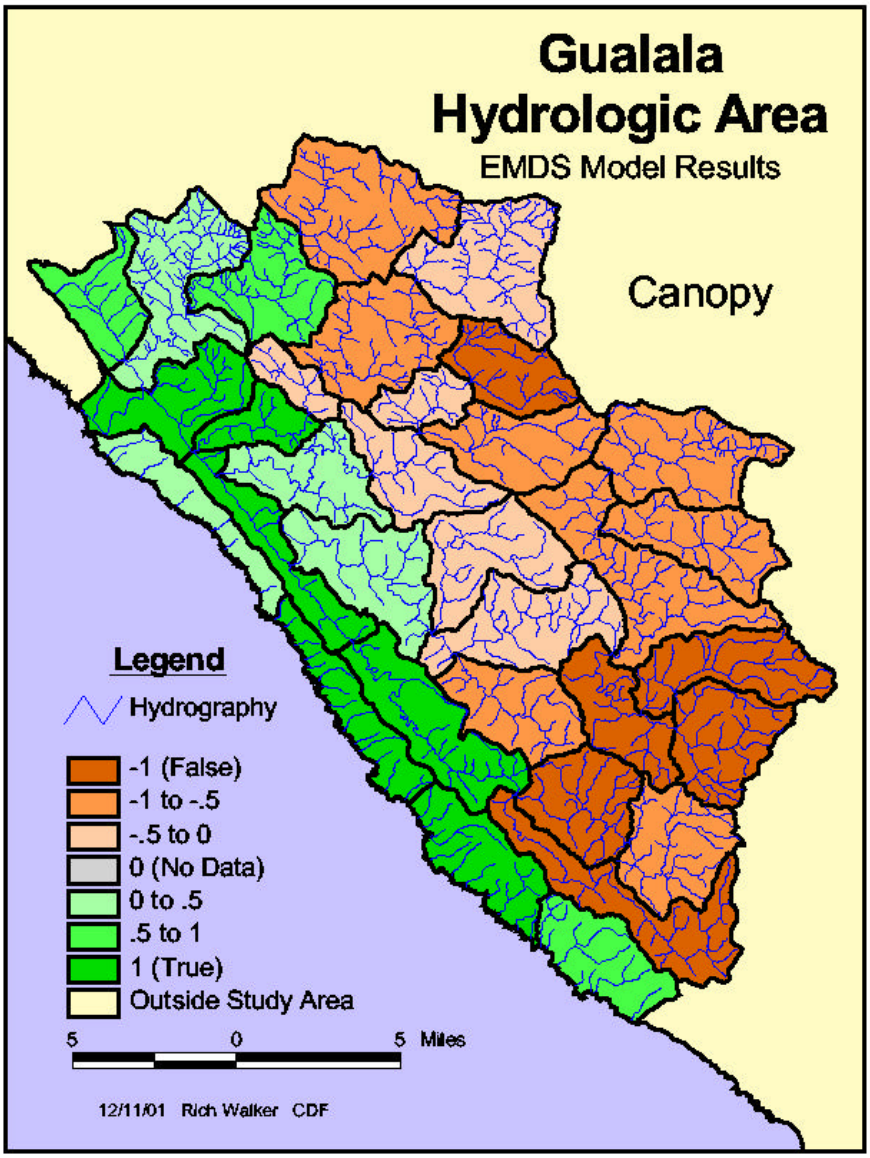
Proposition:

The condition of the natural vegetation in the upland of the Planning Watershed is suitable for sustaining healthy populations of native anadromous salmonids

Evaluated from:

CANOPY – percent of vegetation within pre-EuroAmerican settlement range of variation

SERAL OPENINGS – percent of area in vegetation <= 10 years since last stand-replacing disturbance



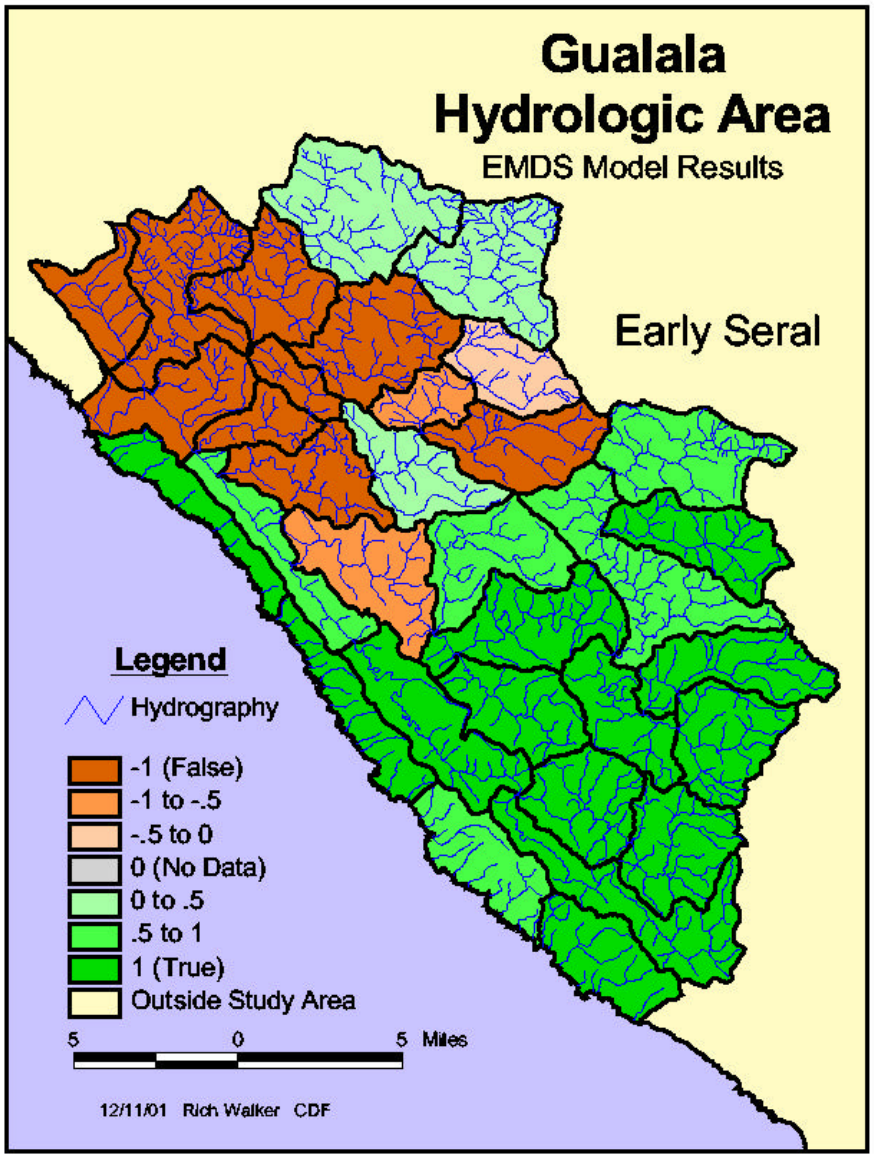
CANOPY –

Proposition:

The condition of the vegetation canopy in the Planning Watershed is suitable for sustaining healthy populations of native anadromous salmonids

Evaluated from percentage of vegetation within pre-EuroAmerican range of variation, using total area in size classes with dbh >= 24".

Break Points: 30% low, 75% high
Units: area/area (%)



EARLY SERAL –

Proposition:

The amount of the early seral vegetation in the upland of the Planning Watershed is suitable for sustaining healthy populations of native anadromous salmonids

Evaluated from the percentage of area in vegetation <= 10 years since last stand-replacing disturbance

Break Points: 10% low, 30% high
Units: area/area (%)

Model Needs

- Compare initial model results with ground reality and expert opinion; revise.
- Reviews of model architecture, possible revisions
- Refinement of basis for dependency curve break points
- Use of “Reference” watersheds to establish break points
- Possible incorporation of other models (e.g., SEDMODL)
- Methods for collecting and processing data to feed the model
- Model Validation - Sensitivity Analysis